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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,404	07/03/2003	David F. Kronholm	286638.121US2	7464
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WILMERHALE/BOSTON 60 STATE STREET BOSTON, MA 02109			EXAMINER MCCRACKEN, DANIEL	
			ART UNIT 1793	PAPER NUMBER
			NOTIFICATION DATE 01/10/2008	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/614,404	<b>Applicant(s)</b> KRONHOLM ET AL.	
	<b>Examiner</b> Daniel C. McCracken	<b>Art Unit</b> 1793	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12/5/2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 51-53,57-59,61-67,69-71,73-92,122 and 123 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 51-53,57-59,61-67,69-71,73-92,122 and 123 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                                  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____   |

### **DETAILED ACTION**

Citation to the Specification will be in the following format (S. # : ¶) where # denotes the page number and ¶ denotes the paragraph number. Citation to patent literature will be in the form (Inventor # : LL) where # is the column number and LL is the line number. Citation to the pre-grant publication literature will be in the following format (Inventor # : ¶) where # denotes the page number and ¶ denotes the paragraph number.

#### ***Response to Arguments***

Those rejections mooted by cancellation are withdrawn. Amendments to the claims will be entered. All art rejections (35 USC §§102-103, double patenting) are withdrawn. Applicants amendments and arguments – specifically the filter location and treatment of the “second gas stream” were persuasive. New rejections appear forthwith.

#### ***Claim Objections***

Claims 90 and 123 are objected to for depending upon a non-elected claim.

#### ***Double Patenting***

Claims 91 and 122 objected to under 37 CFR 1.75 as being a substantial duplicate of claim 51. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. The references cited teach each and every limitation of the rejected claims. The pinpoint citations provided are in no way to be construed as limitations of the teachings of the reference, but rather illustrative of particular instances where the teachings may be found.

Claims 51-53, 57-59, 61-67, 69-71, 73-92, 122 and 123 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,304,366 to Lorents, et al. in view of US 5,985,232 to Howard.

The Examiner resolves the level of ordinary skill in the art to be high, presumably a PhD level chemical engineer with fullerene synthesis experience. The references listed on Applicants IDS are indicative of the level of ordinary skill in the art.

With respect to Claims 51, 91, 122, 78, 81, 83, 85, and 92 Lorents recites a process for producing and separating fullerenes. *See generally* (Lorents 2: 20 *et seq.*). Lorents recites a filter chamber with a plurality of filter means that remove soot from suspended fullerenes. *See* (Lorents 4: 13-25, "Fig. 2"). The temperature of the filter chamber can be controlled to keep fullerenes in the gaseous phase. *See generally* (Lorents 4: 43 *et seq.*). Lorents then condenses the fullerenes. (Lorents 5: 8-22). To the extent Lorents may vary from the instant claims, it lies in noting that Lorents recites an "arc discharge" synthesis technique versus a flame synthesis technique. US 5,985,232 to Howard (among others) recites a flame synthesis technique. *See e.g.*

(Howard 5: 10 *et seq.*). One would be motivated to substitute the flame synthesis technique of Howard for the arc discharge of Lorents for any number of reasons, for example the ability to operate continuously with hydrocarbon fuels versus graphite rods, or as Howard recognizes, lower operating temperatures. (Howard 5:18 *et seq.*). It is further noted that, contrary to Applicants arguments, gaseous fullerenes were known to exist and for sufficient enough times that they could be separated by molecular weight. *See* (Lorents 5: 8). Assuming *arguendo* Applicants were the first to discover this phenomena as it pertains to flame synthesis of fullerenes, Lorents still teaches that gas phase fullerenes can be separated from soot via filtration and control of temperature. (Lorents 4: 13 *et seq.*). Thus, to the extent there *may* be no express *in haec verba* teaching, suggestion or motivation (the Examiner has provided at least one found expressly in Howard), the combination of the two results in “a process that is more desirable, for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient. Because the desire to enhance commercial opportunities by improving a product or process is universal—and even common-sensical— . . . there exists in these situations a motivation to combine prior art references even absent any hint of suggestion in the references themselves.” *Dystar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 80 USPQ2d 1641, 1651 (Fed. Cir. 2006). *See also KSR Int'l.Co. v. Teleflex, Inc.*, 82 USPQ2d 1385 (U.S. 2007).

As to Claims 52-53, 84, and 123, Lorents recites the claimed temperatures. (Lorents 5: 23-33). As to Claims 57, Howard recites a residence time of 18.8 ms. (Howard 6: 35). As to claim 58, Howard recites collecting soot at different locations (i.e. at different residence times). *See e.g.* (Howard 7: 25 *et seq.*). Optimization of result effective variables (i.e. residence time) is

within ordinary skill in the art. *In re Boesch*, 205 USPQ 215, 219 (CCPA 1980). As to Claim 59, the filter chamber shown in Lorents (Fig. 2) would necessarily result in the creation of a second stream with a soot fraction lower than the stream on the other side (upstream side) of the filter. As to Claim 61-67 and 80 Lorents reasonably suggests any filter is acceptable. (Lorents 4: 19 *et seq.*). As to the “time and location” limitations, Howard recites optimal collection locations. *See e.g.* (Howard 7:8 *et seq.*; “Table 1”) (noting that flame temp has effects on fullerene production). As to Claim 69, Lorents recites the condensation of pure fullerenes. (Lorents 6: 26-29). As to Claims 70-71 and 73, as a flame synthesis process is being claimed and Howard recites a flame synthesis process, it is expected that the formation mechanisms are the same. As to Claims 74, the filter chamber in Lorents (which results in second streams or condensed streams) necessarily results a stream that is enriched in fullerenes versus that upstream of it. As to Claim 75, Fig 3 of Lorents reasonably suggests the makeup of the condense material. As to Claims 76-77 and 82 the filter values taught by Lorents suggest the size of the particles. *See e.g.* (Lorents 4: 35-40). As to Claim 86, Howard recites the addition of inerts. (Howard 6:42). As to Claims 87-88, the material collected by Lorents would appear to be free of PAH and soot. As to Claim 90, Howard recites the addition of an oxidative species. (Howard 5:63 *et seq.*).


### ***Conclusion***

All amendments made in response to this Office Action must be accompanied by a pinpoint citation to the Specification (i.e. page and paragraph or line number) to indicate where Applicants are drawing their support.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel C. McCracken whose telephone number is (571) 272-6537. The examiner can normally be reached on Monday through Friday, 9 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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